

Beyond Extraction: Circular Economy and Sustainable MSME Growth in Resource-Rich Regions - A Jharkhand Perspective

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ABSTRACT

The current research analysed the influence of circular business models on sustainable growth of the MSMEs operating in the state of Jharkhand, India. The research approach that has been applied for the purposes of gathering relevant data is a quantitative approach, which involved distribution of a structured questionnaire to 300 MSMEs in the manufacturing, mining, and recycling industries in Jharkhand, followed by statistical data analysis. From the findings that have been generated, it is clear that the level of awareness of the concept of circular economy was moderate to high for the case of MSMEs ($M = 3.85-4.20$) considering its effects on both the environment ($M = 4.20$) and the economy ($M = 4.05$). However, there were challenges that acted as barriers to the adoption of the concept such as high costs of adopting ($M = 4.20$), inadequate financial resources ($M = 4.15$), and poor infrastructure ($M = 4.05$). On the other hand, there were opportunities for adopting the concept that involved cost savings ($M = 4.20$), effective utilization of resources ($M = 4.15$), and rising consumer interest in green products ($M = 4.10$). The regression analysis shows that the adoption of the concept enhances sustainable development of MSMEs ($\beta = 0.34, p < 0.001$). The research results indicate that there is great potential in MSMEs for facilitating the transition towards circular economy in resource-rich areas, if only support systems in terms of finance, technology, and policies become better developed.

Keywords: *Circular Economy; MSMEs; Sustainable Growth; Resource-Rich Regions; Jharkhand; Waste Management; Resource Efficiency; Sustainable Development.*

1. Introduction

In the wake of increasing concern for natural resources and environment, the move towards the concept of Circular Economy has gained momentum compared to the old Linear Economic model (Garg et al., 2025). The difference between the two lies in the efficient usage of resources and wastage of minimum resources in the circular economy compared to the take-make-dispose principle followed by the traditional economic model (Rathi et al., 2022). The concept of circular economy has now become increasingly important particularly in developing countries where heavy industrialization and over-exploitation of natural resources has caused environmental hazards. One such place is Jharkhand (Ghosh et al., 2024).

MSMEs have played a significant role in the process of economic development through their contributions towards job creation, production and regional economic growth (Malik et al., 2022). However, MSMEs that operate within resource-based economies may be overly reliant upon resource extraction while lacking both technological and financial capability for the same (Mishra et al., 2024). In such instances, the incorporation of principles of circular economy can help to minimize the reliance on resources (Brendzel-Skowera, 2021). Nevertheless, the implementation of circular economy practices in such organizations can vary widely based upon the degree of development of the country or region (Ferasso et al., 2020).

The primary objective of the research study is to explore the role of circular practices in promoting sustainable development of MSMEs in the state of Jharkhand. This research study will look to analyze the level of awareness and usage of circular practices by MSMEs in Jharkhand; understand the challenges

being faced by organizations in adopting circular practices; understand the opportunities available to MSMEs and what support mechanisms exist for them and finally to analyse the future role of MSMEs in circular economy transition.

In order to achieve all that, the study will apply the quantitative methodology, which will involve collecting primary data from the structured survey administered to the owners/managers of MSMEs. Sample population for this research will be respondents from different industries such as manufacturing, mining and recycling companies. Data collected will be subjected to analysis by using different statistical tools that will include: descriptive statistics, reliability analysis and regression or SEM analysis.

The uniqueness of this study lies in applying the theory of circular economy in relation to the development of MSMEs in a region that possesses abundant resources. In contrast to other similar studies, the current one contributes region specific insights into the topic and focuses on the transition from extractive economy to circular economy. Scientific contributions of this study include the application of theories of sustainable development in relation to MSMEs.

2. Literature Review

Circular Economy has received much attention as an innovative approach that aims at revolutionizing the conventional linear "take-make-dispose" economy (Chakraborty et al., 2025). In terms of early literature, the idea of circular economy is defined as a closed-loop system which emphasizes the minimization of waste and maximization of resources by methods including reuse, recycle, remanufacture, and ecodesign (Sabale et al., 2025). Modern literature emphasizes that there is an increased use of circular economic activities to create a link between economic growth and resource consumption and minimize their impact on environment and ecosystems (De La Cuesta-González & Morales-García, 2022). In developing countries like India, especially due to increasing industrialization and resource scarcity, the use of circular economy is much more relevant (Mohite et al., 2025). It is evident that circular economy practices can enhance resource productivity and reduce greenhouse gas emissions.

As such, the significance of Micro, Small and Medium Enterprises in the context of economic growth, creation of jobs and innovation cannot be underestimated (Virmani et al., 2022). There exists extensive research in literature on the significance of the MSME sector in the manufacturing industry, however, there are many challenges faced by these enterprises ranging from lack of capital, lack of technology and even regulation (Chakraborty et al., 2023). Literature reveals that the adoption of circular economy in the MSME sector will not only increase efficiency, lower cost and generate income, but also help recycle waste materials into innovative products (Scipioni et al., 2021).

In recent times, studies related to the facilitators and inhibitors of the adoption of the circular economy by MSMEs have gained traction (Haque et al., 2023). The important facilitators that have been identified are technological development, policy initiatives, stakeholder interaction, and capability of organizations. Important inhibitors of adopting the circular economy are finances, low awareness among businesses, and poor infrastructure development (Rodrigues & Franco, 2023). For example, it has been observed that technological advancement and information exchange help organizations to adopt the circular economy. However, the financial requirements involved in adopting this concept act as an impediment in implementing it by organizations (Kamal et al., 2022).

The next relevant stream of research focuses on the relationship between circular economic practices and various theories such as the Resource-Based View (RBV), Industrial Ecology, and Technology Adoption Frameworks (Chowdhury et al., 2022). Such approaches allow one to understand how companies can gain competitive advantages based on their ability to use certain capabilities associated with resource

efficiency, energy usage, and innovation. Research built on the RBV concept reveals the potential of MSMEs to capitalize on environmental challenges by developing unique capabilities for waste management and circular processes (Despoudi et al., 2025). Another significant factor is the implementation of digital technologies such as blockchain, artificial intelligence, and Industry 4.0 innovations to facilitate circular supply chains (Alhowaish, 2026).

With respect to India, there is recent scholarly work showing the importance of the emergence of circular economic practices within various industries, such as manufacturing, textiles, energy, and waste management (Suchek & Franco, 2024). In this regard, researchers indicate that the large number of MSMEs in India creates an excellent opportunity to move towards a circular economy (Sharma & Sharma, 2026). The main means for achieving this goal can be the use of localized forms of circular economic practice, including industrial symbiosis, recycling clusters, and bio-economies (Ghisetti & Montresor, 2020). At the same time, the scholarly literature shows that the uneven development of various parts of the country leads to some problems related to the implementation of circular economic strategies (Murugan & Nprabadevi, 2025). Thus, regions rich in natural resources, including Jharkhand with its mining economy, are faced with such challenges.

However, despite the increasing academic literature available, no empirical studies specific to regions have examined the connection between circular economy approaches and MSMEs in resource-endowed regions. Literature mainly concentrates on national or sector-based studies, leaving behind any regional focus on industrial ecosystem and circular transition. Besides, very little work is seen around ways through which circular economy can help move such resource-abundant areas “beyond extraction” into creating sustainable value and inclusive economic growth. It, therefore, becomes important for researchers to study the applicability of circular economy within MSME development in resource-endowed regions like Jharkhand.

3. Methodology

In the current study, a quantitative approach will be employed to evaluate the effects that arise from the adoption of circular economy practices on the sustainable development of MSMEs in Jharkhand. More specifically, this study will make use of primary data collected via a survey among the owners/managers of MSMEs, among others. In this regard, the survey will consist of close-ended questions which will be answered based on a five-point Likert scale from ‘strongly disagree’ to ‘strongly agree’. On the other hand, the sample population for this study entails MSMEs in resource-intensive industries such as mining, manufacturing, recycling, and other related industries.

The study makes use of purposive and convenience sampling for the selection of participants who possess knowledge or experience regarding resource usage and business activities. Some of the important variables of this research study are circular economy (including resource recycling, reuse, waste management, and efficiency), which will be used as independent variables, while sustainable growth of MSMEs (through their economic, environmental, and social contributions) will be used as the dependent variable.

Data analysis will be done using statistical methods with the aid of software such as SPSS and SmartPLS. The first step for analysis is reliability testing (Cronbach’s Alpha) to test for the reliability of the data collected. After that comes validity testing (factor analysis) to verify the constructs measured. Finally, regression analysis or Structural Equation Modeling (SEM) will be carried out to analyze the relationship between circular economy and growth of MSMEs. SEM will be very helpful here since it analyzes multiple variables at once.

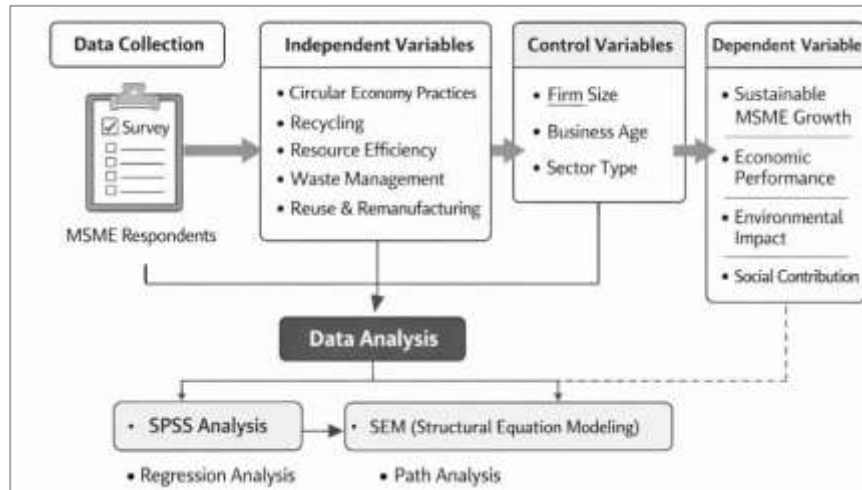


Figure 1: Research Methodology Framework for Circular Economy and MSME Growth

As depicted in figure 1, the systematic approach used for researching the effects of practices relating to the circular economy on growth of MSMEs is illustrated. This includes the process starting from data collection, followed by independent, control, and dependent variables before finally leading to data analysis through SPSS and SEM methods.

4. Results

4.1. Socio-Economic and Firm Profile of Respondents

This chapter discusses the demographic and business profile of MSME respondents. These include variables such as age, gender, educational attainment, firm size, industry type (mining, manufacturing, recycling industries, among others), and duration of operations. It will help in knowing more about the profile of the respondents and how representative they are in the research.

Table 1: General Information: Profile of MSME Respondents in Jharkhand

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	210	70.0
	Female	90	30.0
Age Group	Below 30 years	60	20.0
	30–40 years	120	40.0
	41–50 years	75	25.0
	Above 50 years	45	15.0
Education Level	Secondary	50	16.7
	Graduate	160	53.3
	Postgraduate & Above	90	30.0
Firm Size	Micro Enterprise	140	46.7
	Small Enterprise	110	36.7
	Medium Enterprise	50	16.6
Sector Type	Manufacturing	120	40.0
	Mining & Resource-based	80	26.7
	Recycling/Waste Management	50	16.7
	Others	50	16.6
Years of Operation	Less than 5 years	70	23.3
	5–10 years	130	43.3
	More than 10 years	100	33.4

The demographics and characteristics of the firms participating from Jharkhand are illustrated in Table 1 below. It provides the profile of the respondents based on their gender, age, educational attainment, size of the firm, industry, and years in business.

4.2. Level of Awareness and Adoption of Circular Economy Practices

In this section, the emphasis will be placed on examining the knowledge level of MSMEs concerning circular economy concepts and their level of implementation. Some of the activities to be examined will include recycling, reusing, waste disposal, and resource efficiency. The knowledge level and implementation level will be assessed using descriptive statistics and averages.

Table 2. Awareness and Perceptions of Circular Economy Practices among MSMEs in Jharkhand

S. No.	Statements	Mean	Std. Deviation
1	Awareness of circular economy concepts	3.85	0.82
2	Understanding of recycling and reuse practices	3.92	0.76
3	Importance of resource efficiency in business operations	4.10	0.69
4	Adoption of waste reduction strategies	3.74	0.88
5	Perceived economic benefits of circular practices	4.05	0.72
6	Environmental benefits of circular economy	4.20	0.65
7	Willingness to adopt circular economy practices	3.95	0.80
8	Awareness of government policies supporting circular economy	3.40	0.95
9	Perception of circular economy as a competitive advantage	3.88	0.78
10	Readiness to invest in sustainable and circular technologies	3.70	0.84

Table 2 shows the awareness level and perceptions about circular economy practices amongst MSMEs in Jharkhand. From the data analysis, it can be concluded that there exists an overall positive perception especially about the economic and environmental advantages of such practices. The level of awareness about government assistance is relatively low.

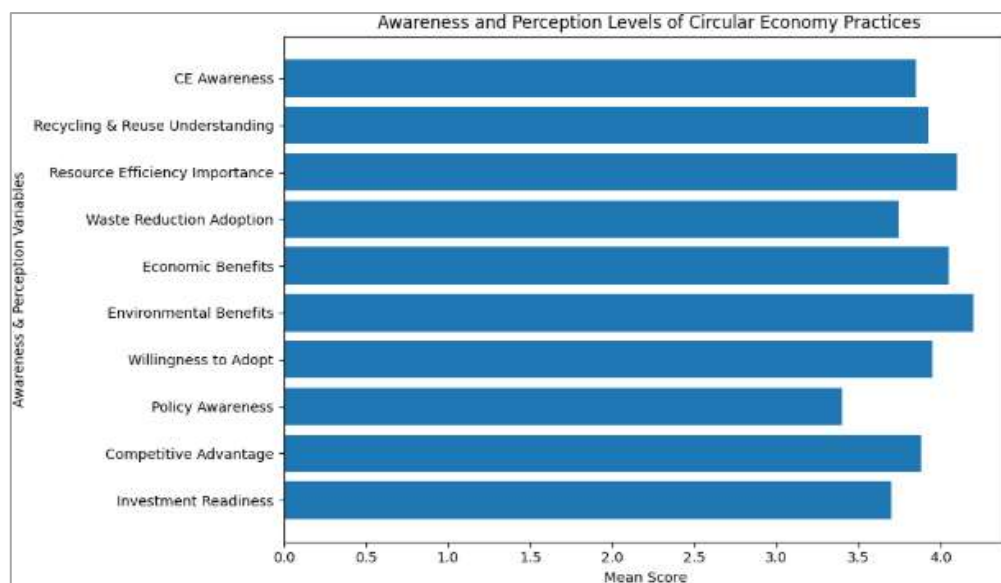


Figure 2. Awareness and Perception Levels of Circular Economy Practices

Figure 2 shows the average values for awareness and perception regarding the circular economy practices of MSMEs in Jharkhand. According to the results, there seems to be more agreement on the effects of circular economy practices on the environment and economy. It reflects a positive perception on sustainability. However, low values were obtained when it comes to policy awareness and investment preparation.

4.3. Barriers and Challenges in Circular Economy Implementation

This section identifies key constraints faced by MSMEs in adopting circular economy practices. Factors such as financial limitations, lack of technology, inadequate infrastructure, policy gaps, and low awareness are analyzed. Factor analysis or ranking methods may be used to determine the most significant barriers affecting implementation.

Table 3. Barriers and Challenges to Circular Economy Adoption among MSMEs in Jharkhand

S. No.	Barriers and Challenges	Mean	Std. Deviation
1	High initial cost of adopting circular technologies	4.20	0.71
2	Lack of access to finance and funding support	4.15	0.75
3	Limited awareness and knowledge about circular economy	3.95	0.82
4	Inadequate infrastructure for recycling and waste management	4.05	0.78
5	Lack of technical expertise and skilled workforce	3.90	0.85
6	Weak government support and policy implementation	3.80	0.88
7	Resistance to change in traditional business practices	3.70	0.90
8	Limited market demand for recycled or sustainable products	3.65	0.92
9	Difficulty in integrating circular practices into existing operations	3.85	0.83
10	Lack of collaboration among industries and stakeholders	3.75	0.87

As per Table 3 above, the major challenges faced by MSMEs in adopting circular economy models in Jharkhand are due to monetary constraints and high investment costs. Besides this, other factors such as lack of knowledge and infrastructure problems act as challenges.

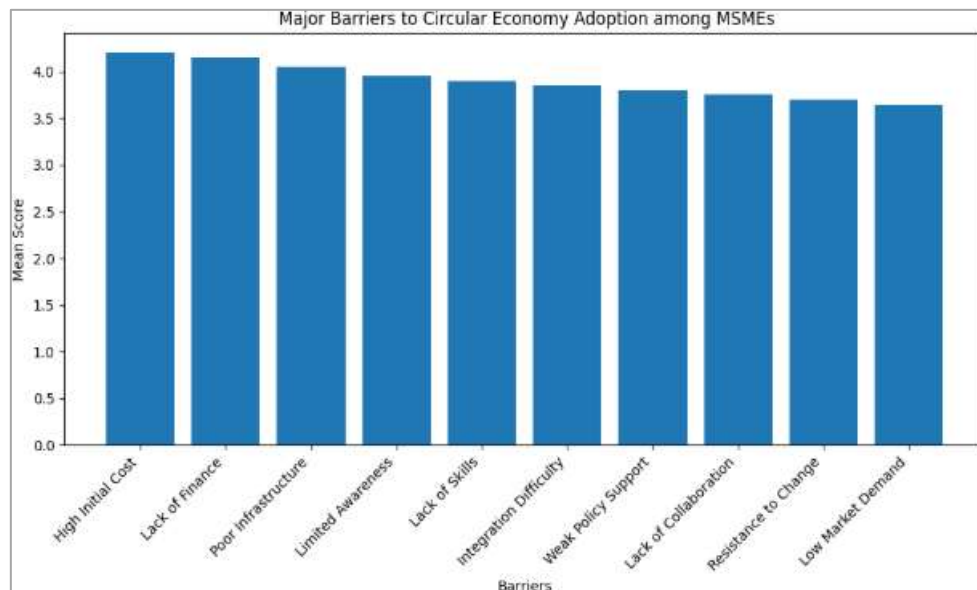


Figure 3. Major Barriers to Circular Economy Adoption among MSMEs

Figure 3 shows the ranking of major obstacles that small and medium enterprises face in implementing circular economy models using the average score. The high initial cost and the lack of financial support are seen to be among the major obstacles that have the greatest impact on the process of implementing the circular economy.

4.4. Opportunities, Enablers, and Institutional Support

The subject will focus on the possible advantages that could come from implementing circular economies for MSMEs. The areas that will be assessed include topics such as government intervention, financing, innovations, training, and industrial partnerships. Other policies and structures that could help MSMEs adopt circular economies will also be looked at.

Table 4. Opportunities and Support for Advancing Circular Economy Practices among MSMEs in Jharkhand

S. No.	Opportunities and Support Factors	Mean	Std. Deviation
1	Availability of government incentives and subsidies	3.90	0.80
2	Access to financial assistance for sustainable initiatives	3.85	0.82
3	Adoption of innovative and green technologies	4.05	0.70
4	Training and awareness programs on circular economy	4.00	0.75
5	Collaboration with industry partners and stakeholders	3.95	0.78
6	Growing market demand for eco-friendly products	4.10	0.68
7	Support from government policies and regulatory frameworks	3.88	0.81
8	Opportunities for waste recycling and resource optimization	4.15	0.65
9	Digital technologies enabling circular practices	3.92	0.79
10	Potential for cost reduction through efficient resource utilization	4.20	0.66

The opportunities and support that could be used to promote the practice of circular economy in MSMEs in Jharkhand have been identified in Table 4. The results clearly show that there is much scope in areas like resource management, eco-product demand from the market, and reduced costs, among others. Government involvement and technological advancement also form an integral part of the process.

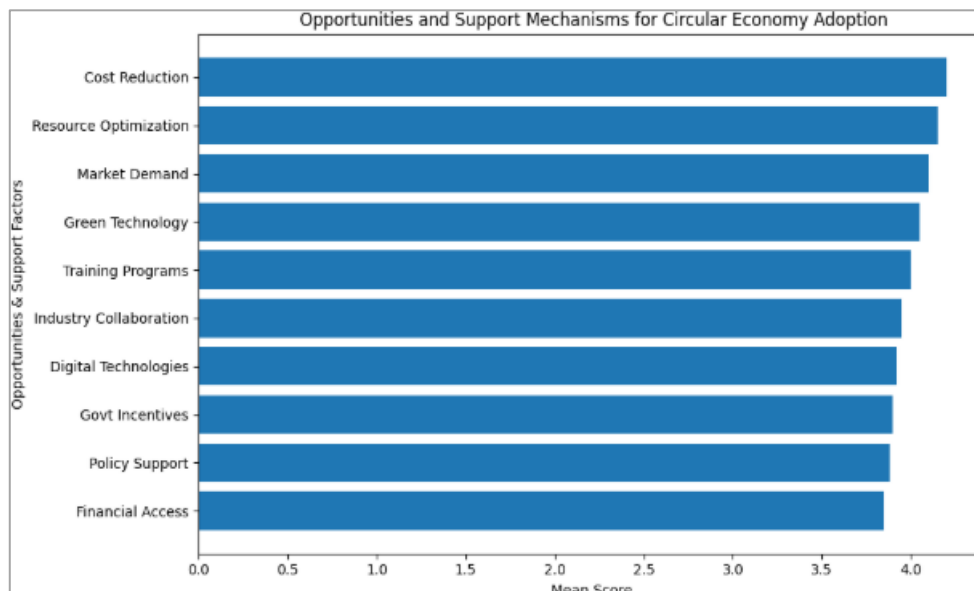


Figure 4. Opportunities and Support Mechanisms for Circular Economy Adoption

The following is an illustration from Figure 4 indicating the opportunities and factors supporting the circular economy adoption by MSMEs operating in the state of Jharkhand. The analysis suggests that cost cutting, efficiency, and rising demand are some of the main factors driving circular economy adoption. Besides, other essential support factors include government assistance, innovations, and training programs.

4.5. Impact of Circular Economy Practices on Sustainable MSME Growth

This will become the central part of the study, where the outcomes of the regression analysis or structural equation modeling will be evaluated. It deals with the relationship between the application of the concept of circular economy on the sustainability of development of MSMEs.

Table 5. Future Role of MSMEs in Advancing Circular Economy in Jharkhand

S. No.	Future Roles and Strategic Actions	Mean	Std. Deviation
1	Adoption of sustainable production and eco-friendly practices	4.20	0.68
2	Investment in green and circular technologies	4.10	0.72
3	Development of recycling and waste management systems	4.15	0.70
4	Promotion of resource efficiency and energy conservation	4.25	0.65
5	Collaboration with government and industry stakeholders	4.05	0.75
6	Participation in circular supply chains	3.95	0.80
7	Innovation in product design for reuse and recycling	4.00	0.78
8	Enhancing awareness and training on circular economy practices	4.18	0.69
9	Leveraging digital technologies for sustainable operations	3.90	0.82
10	Contribution to environmental sustainability and social responsibility	4.30	0.60

As can be seen from Table 5 below, the future strategy of MSMEs in facilitating circular economy practices in Jharkhand is clearly defined. Sustainability, resource utilization, and environmental awareness are some of the areas that have been prioritized in the findings.

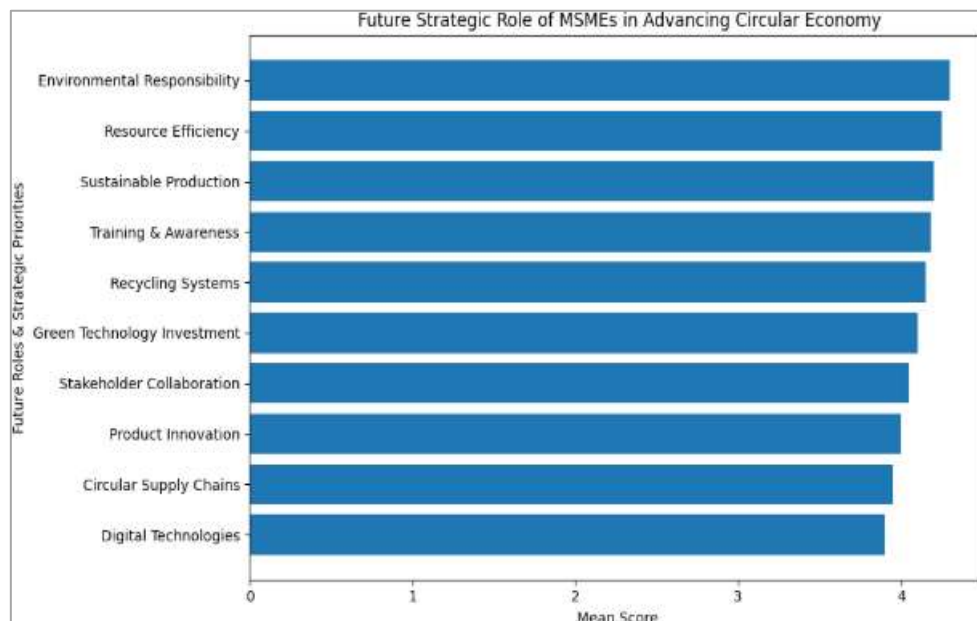


Figure 5. Future Strategic Role of MSMEs in Advancing Circular Economy

The above Figure 5 illustrates the crucial future roles and strategic priorities of MSMEs in adopting practices of circular economies in the state of Jharkhand. The environmental sustainability, efficient use of resources, and sustainable manufacturing become the topmost priority areas for the concerned organizations.

4.6. Future Outlook: Strategic Role of MSMEs in Circular Economy Transition

This segment gives an understanding of the future opportunities for MSMEs in promoting circular economy projects in resource-abundant areas. The segment explains strategic approaches that include industrial symbiosis, green innovations, and sustainable value chains. This segment also sheds light on the importance of MSMEs in sustainable development in the long run.



Figure 6. MSMEs' Evolving Role in the Circular Economy Transition in Resource-Rich Regions: A Jharkhand Perspective

Figure 6 below is an example demonstrating the importance of MSMEs in promoting circular economy adoption in resource-rich areas such as Jharkhand. The example shows the importance of various parameters in relation to MSME operations. The framework above shows that by adopting all these factors in combination, there is a possibility for MSMEs to promote economic growth and circular transformation.

5. Discussion and Policy Implications

It has been found out that MSMEs in the state of Jharkhand have good knowledge about circular economy concepts. The main aspects that can benefit from these concepts include the environment as well as the economic aspect. Despite the high level of awareness among MSMEs, adoption rates are still low due to the presence of various barriers. Nevertheless, a variety of opportunities indicates high adoption potential in the future.

Policy Implications

- Financial incentives should be provided (subsidies, low-interest loans)
- Trainings and awareness campaigns should be improved
- Meanwhile, recycling facilities and waste management facilities should be created
- Green technologies can also be promoted Such measures may lead to the successful adoption of circular economy concepts by MSMEs.

6. Conclusion

In this paper, the importance of circular economy in contributing towards the sustainable growth of MSMEs operating in Jharkhand was explored. As per the findings, although MSMEs have a good perception about circular economy and its benefits, the adoption process of the same among the MSMEs is currently at an underdeveloped stage because of certain financial and infrastructural hurdles.

However, apart from these challenges, some notable opportunities were also found out. Increasing demand in the market, cost effectiveness and technological innovations were considered to be some key opportunities for the successful adoption of circular economy by MSMEs. Thus, based on the above analysis, it can be concluded that MSMEs can contribute positively towards achieving economic, environmental, and social sustainability goals.

The current study provides sufficient evidence to suggest that MSMEs can act as important drivers of circular economy transition. It can be stated that MSMEs can contribute towards making regions rich in natural resources achieve sustainable and inclusive growth through appropriate financial and policy support.

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